Botanical Gazette.

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Editorial.—MR. J. G. LEMMON has published a small pamphlet entitled "Ferns of the Pacific Coast, including Arizona." A full conspectus of the tribes and genera is given, and also a classified list of the species, giving the principal points of distinction and places of growth. The announcement is also made that Mrs. Lemmon is about to publish a "Manual of Pacific Ferns." The price of the pamphlet is 35 cts., or $3.50 per dozen.

MR. J. SAUNDERS has given in *Hardwicke's Science-Gossip* the results of his study of Gray's Manual of Botany with reference to the colors of fruits of the northern United States. He includes both colored fruits and seeds, and finds that there is a great preponderance of red and black, the former being about 45 per cent., the latter about 33 per cent., while yellow, blue and white occur only in very limited numbers.

S. E. CASSINO is just about to publish a work on North American Lichens by our highest authority, Prof. Edward Tuckerman. It will appear in volumes and be sold at a very low figure. As a very small edition is to be printed and the work is not to be stereotyped orders should be sent in early. The price for Vol. I has been fixed at $3.50, though orders received before March 1st will be filled at 10 per cent. discount. The first volume will be 8vo. and will contain nearly 300 pages, comprising the *Parmeliacei*, *Cladonici* and *Cenogoniei*.

JAMAICA MUST BE a paradise for the fern collector, over 450 species being enumerated as belonging to its flora.

DR. ENGELMANN, in the January *Torrey Bulletin*, notes the occurence of *Sagittaria natans*, MX., in the Charles River, Mass., observed by Mr. C. E. Faxon, also observed in the Noponset and Ipswich Rivers by Mr John Robinson It never perfects fruit and hence seems not to be at home in these northern waters. In Gray's Manual these northern forms were included in *S. graminea*. *S. pusilla*, Pursh, must now be considered but a subterrestrial form of *S. natans*

MR. DARWIN'S methods of work are peculiarly his own and their results have made astonishing additions to scientific knowledge, but because Mr. Darwin's methods have yielded such results to him it is no indication that any one using the same methods will become a successful investigator. It needs the man as well as the methods, and

there are investigators in this country who have adopted the latter without any thought of the need of the former, and their observations are "as utterly barren of important results as an undigested weather record." The pages of our scientific periodicals are sometimes burdened with such material.

EDITOR GAZETTE:—Your note about oaks on page 2 of the January number puts a greater responsibility on me than I am capable to bear. I have seen of Buckley's Oaks only miserable and incomplete dried specimens and could therefore only make guesses and suggestions on them and not "decisions." How important and necessary it is for a "closet-botanist" to occasionally refresh his botanical vision by communing with living nature I have seen on my extended visits to the Pacific States and the Rocky Mountains. My observations there have furnished new views and suggested different corrections of former statements; a few of them you printed in the last number, others will follow. But I must confess that I am not any farther advanced in the knowledge of those Texas Oaks, never having had the opportunity to study them in numerous and complete herbarium specimens nor having seen them growing. Buckley's *Quercus Texana* is undoubtedly correctly placed by him with the polymorphous *Q. rubra*. —G. ENGELMANN.

NO DEPARTMENT OF BOTANY seems to the average botanist so unsatisfactory and perplexing as that of Fossil Botany. We all know how difficult it is to name plants when the specimens are only tolerably complete, but to name them from the merest fragments of stems and leaves is something that must border very closely upon guess work. Such naming too becomes of very great importance when the age of formations rests upon the evidence of fossil plants. It would sometimes seem as if the botanist started in with the idea that the fragments must of necessity belong to genera and species unlike any living in the same region. Still some splendid work has been done and our countryman, Mr. Lesquereux, has had by no means the least share in it. As an instance of the uncertainty of such work at the best, Mr J. Starkie Gardner, in a late copy of *Nature*, speaks of Dr Heer's work upon the fossil flora of Madeira. The terminal leaflets of a *Rubus* were referred to *Corylus*, and the various leaflets of another species of *Rubus* were referred to *Corylus*, *Ulmus* and *Psoralea*, and so on in several other instances.

OF THE MULTIPLICATION OF SPECIES there is no end. The collector's first ambition is to find new species and when that is gratified and many new species bear the discoverer's name, the next ambition is to name the new species himself. It is not very hard, nor does it take many appliances to name and describe a species as new, but it is very hard and it takes the greatest command of appliances to discover the fact of its being really new. One generation coins specific names, a large percentage of which appear in the synonymy of the next generation. Any one looking over the species of Torrey and Gray's Flora of a generation ago and then hunting in Watson's Index to see what has

become of them will appreciate this fact. But still species are described by botanists with a limited collection of plants, a still more limited library and sometimes even with no proper conception of what constitutes a species. Any one may get the credit of describing a new species authoritatively by referring it to competent authorities, upon whom after all will fall the burden of the work in deciding its genuineness. Many forms are now enjoying the pleasure of a name "for a season," and many a species in this and other countries is bearing two or more names, and only waiting for the question of priority to be settled.

MR. F. KITTON in *Science-Gossip* describes the method of staining vegetable tissues practised as early as 1774. We give it for the benefit of some of our friends who are laboring over the preparation of beautiful slides, as containing some hint that may be of service. "Dissolve one drachm of sugar of lead in one ounce and a half of water; filter the material. A stem, or piece of a small branch of a tree is to be immersed upright for half its length in this solution, and covered with a glass to prevent evaporation, and allowed to remain two days in it. Cut off the part immersed and throw away. Place the remaining piece in orpiment lixivium (which is thus prepared). Place in a basin two ounces of quicklime and an ounce of orpiment; pour upon them one pint and a half of boiling water. When it has stood a day and a half, it is fit for use. By this process a deep brown stain is produced." This is taken from a work on "The Construction of Timber from its Early Growth, explained by the microscope and proved from experiments in a great variety of kinds By John Hill, 1774."

THERE ARE, and may be always will be, two classes of workers with the microscope. The one class have the microscope itself for an end, and to these the euphonious name microscopist is usually applied. As they have in view continually the perfection of the instrument and all its appliances they naturally run to large and complicated stands with an endless array of accessories. There are the best of reasons for everything they use and they obtain the best of results. The other class consider the microscope simply as a means and have made the science of biology what it is to day. But it is a strange fact that these workers always (we speak now strictly of botanical workers) use the simpler instruments and fewer appliances. The great laboratories of today, those which are furnishing the material for books and are filling our scientific periodicals with the results of their work, are equipped with very simple instruments. Does it follow that if such work can be done by ordinary instruments even more astonishing results can be obtain by using finer ones? Or is it a fact that the extra appliances, etc., are more things of "fuss and feathers" than fruitful additions to biological laboratories? A discussion is now going on in the *Am. Monthly Micr. Journal* concerning the relative value of large and small microscopes, the reading of which suggests to the working biologist some such thoughts as the above.

Siberian Vegetation.—Baron Nordenskjold in his "Voyage of the Vega," gives a sketch of a journey up the Yennissi River, in which occurs the following account of the vegetation: "As is the case with all the other Siberian rivers running from south to north, the western strand of the Yenisej, wherever it is formed of loose, earthy layers, is also quite low and often marshy, while on the other hand the eastern strand consists of a steep bank, ten or twenty metres high, which north of the limit of trees is distributed in a very remarkable way into pyramidal pointed mounds. Numerous shells of crustacea found here, belonging to species which still live in the Polar Sea, show that at least the upper earthy layer of the *tundra* was deposited in a sea resembling that which now washes the north coast of Siberia."

"On the slopes of the steep *tundra* bank and in several of the *tundra* valleys there is an exceedingly rich vegetation, which already, only 100 kilometres south of Yefremo-Kamen, form actual thickets of flowering plants, while the *tundra* itself is overgrown with an exceedingly scanty carpet, consisting more of mosses than of grasses. Salices of little height go as far north as Port Dickson (73° 30′ N. L.); the dwarf birch (*Betula nana*, L.) is met with, though only as a bush creeping along the ground, at Cape Schaitanskoj (72° 8′ N. L.); and here in 1875, on the ice-mixed soil of the *tundra*, we gather ripe cloudberries. Very luxuriant alders (*Alnaster fruticosus*, Ledeb) occur already at Mesenkin (71° 28′ N. L.), and the Briochov Islands (70° to 71° N. L.) are in several places covered with rich and luxuriant thickets of bushes. But the limit of trees proper is considered to begin first at the great bend which the river makes in 69° 40′ N. L., a little north of Dudino. Here the hills are covered with a sort of wood consisting of half-withered, grey, moss-grown larches (*Larix Sibirica*), which seldom reach a height of more than seven to ten metres, and which much less deserve the name of trees than the luxuriant alder bushes which grow nearly 2° farther north. But some few miles south of this place, and still far north of the Arctic Circle, the pine forest becomes tall. Here begins a veritable forest; the greatest the world has to show, extending with little interruption from the Ural to the neighborhood of the Sea of Ochotsk, and from the fifty-eighth or fifty-ninth degree of latitude to far north of the Arctic Circle, that is to say, about one thousand kilometres from north to south, and perhaps four times as much from east to west. It is a primeval forest of enormous extent, nearly untouched by the axe of the cultivator, but at many places devastated by extensive forest fires."

"On the high eastern bank of the Yenisej the forest begins immediately at the river bank. It consists principally of pines; the Cembra pine [*P. Cembra* L.], valued for its seeds; enormous larches: the nearly awl-formed Siberian pine [*P. Sibirica*, Ledeb.]; the fir [*P. obovata*, Turcz.]; and scattered trees of the common pine [*P. sylvestris*, L.]. Most of these already north of the Arctic Circle reach a colossal size, but in such a case are often here, far from all forestry, grey and half-dried up with age. Between the trees the ground is so covered with fallen branches and stems, only some of which are fresh,

the others converted into a mass of wood-mould held together only by the bark, that there one willingly avoids going forward on an unbroken path. If that must be done, the progress made is small, and there is constant danger of breaking one's bones in the labyrinth of stems. Nearly everywhere the fallen stems are covered, often concealed, by an exceedingly luxuriant bed of mosses, while on the other hand tree-lichens, probably in consequence of the dry inland climate of Siberia, occur sparingly. The pines, therefore, want the shaggy covering common in Sweden, and the bark of the birches which are seen here and there among the pines is distinguished by an uncommon blinding whiteness."—*Nature*.

Some Notes on Yucca.—YUCCA ELATA: Trunk 3 to 5 feet or more high, leaves linear rigid sharp pointed, filamentose on the white margins; with white oval acute or acuminate bracts as long as the pedicels; flowers white, segments ovate acute, ovary attenuated into a whitish style; capsule cylindrical-ovate obtuse short-cuspidate; seeds large, ½ inch wide narrowly wing-margined.—*Y. angustifolia*, var. *elata*. Engelm. Notes on Yucca p. 50. *Y. constricta*, Baker, Yuccoideæ p. 229; not Buckley.

Deserts of Arizona probably extending into southern New Mexico and Mexico. Altogether one of the most stately Yuccas, distinguished from the closely allied *Y. angustifolia*, with which I had formerly united it by its distinct trunk, which is usually 3 to 5 feet, but which I have seen even 10 or 11 feet high, and 3 to 7 inches thick, and especially by its long flowering scape, 3 to 7 feet, naked below, and bearing a much branched panicle often 5 feet long; flowers spreading, 3½ to 4 inches wide, while those of the allied species are more globose, mostly of greenish color, with broadly oval concave segments, with a green stigma; capsule similar to that of *angustifolia*, seeds of same size as in that species but with a narrower margin. Young specimens flower before they make a trunk and they look much like *Y. angustifolia* but can always be distinguished by the naked scape and by the characters of the flower.

Yucca constricta, Buckley, appears to be a form of *Y. angustifolia* with a short trunk; the constricted capsules ascribed to it are not normal but occasionally occur in all species of Yucca.

YUCCA MACROCARPA, Engelm. 6.224 of this journal, has now been found by C. G. Pringle in flower; the panicle is densely pubescent; flowers about 2½ to 3½ inches wide with broadly oval acutish segments. *Y. baccata* has a glabrous panicle and larger flowers with narrow tapering segments. *Y. Schottii*, Engelm., Yucc. 46, from Arizona, is known only from Schott's notes and very poor specimens and has never been identified since. Its panicle is likewise pubescent; its leaves short, narrow and very thick, with few thin fibres. It may possibly be a small-leaved form of *Y. macrocarpa*, which also shows a few thin fibres on the leaves. Both are recommended to the study of observers.—G. ENGELMANN.

North American Hepaticæ.—Among all the groups of CRYPTOGAMIA the HEPATICÆ seem to receive the least attention from students and are also neglected by general botanical collectors. The group was not recognized by Linnæus as a distinct order yet in Class XXIV in his *Systema Natura* he describes forty-five species distributed among the following genera:—*Jungermannia*, twenty-eight; *Targionia*, one; *Marchantia*, seven; *Blasia*, one; *Riccia*, five; *Anthoceros*, three. Although these Linnæan species to some extent have been redistributed among other genera by later botanists, the genera still remain and include some of our common forms of *Hepaticæ*.

Since the time of Linnæus other genera have been formed by Dumortier, Palisot de Beauvois, Raddi, Micheli, Corda, Nees, Lindenberg, Taylor and Lehmann.

The British *Jungermanniæ* were described by Sir W. J. Hooker in 1816, and those of Germany by T. P. Eckart in 1832.

Corda published the *Genera Hepticarum* from Prague in 1828, and Nees von Esenbeck in connection with Gottsche and Lindenberg published the *Synopsis Hepaticarum* from Hamburg from 1844 to 1847; the latter is as yet the only general work on *Hepaticæ* that has been issued

In our own country there have been only two investigators of prominence. W. S. Sullivant (1803–1873) published the "Musci and Hepaticæ of the Eastern United States," which formed an appendix to one of the earlier issues of Gray's Manual; the copyright bears date of 1856 and this work which is the only one attempting to classify our native species is now out of print and can scarcely be obtained at any price.

In the death of Coe F. Austin, of Closter, N. J., in 1880, America lost not only an enthusiastic botanist but her solitary worker among the Liverworts. His contributions to the subject were unfortunately not arranged in any systematic publication, but are found scattered through various scientific journals, notably the Proceedings of the Philadelphia Academy, BOTANICAL GAZETTE. and the Bulletin of the Torrey Botanical Club. In addition to many notes on species already described, Mr. Austin has described over sixty new American *Hepaticæ* besides many from foreign localities chiefly Japan and the Sandwich Islands. His "*Hepaticæ Boreali-Americanæ exsiccatæ*" containing over one hundred and seventy numbers was first distributed in 1874.

Only a small portion of America has been searched thoroughly for Liverworts. Ohio, New Jersey, Florida and portions of New England, California, and Illinois have been more or less carefully examined but the greater portion of the continent is still new territory. Seventy-six species have been catalogued from New Jersey and forty-five from Illinois, yet in the latter State only a few counties have been carefully examined. The descriptions of the American species being so widely scattered through German and English works and inaccessible works and periodicals published in our own country, and especially being written largely in Latin are not in a form to be of especial

value to the *general* student. In the absence of any American specialist in this group, the subject can receive little aid from general collectors or local botanists until the present knowledge of the subject is systematically arranged for reference and study. To this end the present writer hopes to be able to contribute a compilation of the *Hepaticæ* in a form available for study and further investigation and would be pleased to receive any communications respecting distribution, etc.—LUCIEN M. UNDERWOOD, *Bloomington, Ill.*

The following preliminary list is presented for suggestions and corrections :—

LIST OF NORTH-AMERICAN HEPATICÆ—doubtful species are printed in italics.—

ALICULARIA,
Lescurii, Aust.
ANEURA, Dumort.
latifrons,
multifida, (L.), Dumort. var major.
palmata, (Hedw.), Nees.
pinguis, (L.), Dumort.
pinnatifida, Nees.
sessilis, Spreng.
ANTHOCEROS, L.
cæspiticius, DeNot.
Donnellii, Aust.
fusiformis, Aust.
Hallii, Aust.
Joorii, Aust.
lævis, L.
Lescurii, Aust.
melanosporus, Sulliv.; *Notothylas melanospora*, Sulliv.
Mohrii, Aust.
Olneyi, Aust.
orbicularis, Sulliv.; *Notothylas orbicularis*, Sulliv.
Oreganus, Aust.
punctatus, L.
Ravenelii, Aust.
stomatifer, Aust.
sulcatus, Aust.
ASTERELLA, Beauv.
hemisphærica, (L.), Beauv.; *Reboulia hemisphærica*, Raddi.
BLASIA, Mich.
pusilla, L.
BLEPHAROSTOMA, Dumort.
trichophyllum, (L.), Dumort.
BLEPHAROZIA, Dumort.
ciliaris, (L.), Dumort.
CÆSIUS,
concinnatus, (Lightfoot), B. Gray; *Gymnomitrium concinnatum*, Corda.
CALYPOGEIA, Raddi.
Sullivanti, Aust.
Trichomanis, (Dicks), Corda.
var. rivularis, Aust.
var. tenuis, Aust.
CEPHALOZIA, Dumort.
albescens, Hook.
bicuspidata, (L.), Dumort.
var. conferta, Aust.
catenulata, (Huben.), Aust.
connivens, (Dicks.), Aust.
curvifolia, (Dicks.), Aust.
divaricata, (Engl. Bot.), Aust.
var. confervoides, Aust.
Macouni, Aust.
nematodes, Gott.
Sullivanti, Aust.
CHILOSCYPHUS, Corda.
ascendens, Hook. and Wils.
Drummondii, Tayl.
pallescens, (Dumort.), Nees.
polyanthos, (L.), Corda.
var. rivularis, Aust.
CONOCEPHALUS Hill.
conicus, (L.), Dumort.; *Fegatella conica*, Corda.
DUMORTIERA, Nees.
hirsuta, (Swz.), Nees.
DUVALIA Nees.
rupestris, (Bisch.), Nees.
FIMBRIARIA, Nees.
Bolanderi, Aust.
Californica, Hampe.
elegans, Spreng.
fragans, (Scleich.), Nees.
tenella, Nees.
violacea, Aust.
FOSSOMBRONIA, Raddi.
angulosa, Raddi.
cristula, Aust.
longiseta, Aust.
pusilla, (L.), Nees.
FRULLANIA, Raddi.
æolotis, Nees.
Bolanderi, Aust.
brunnea, Spreng.
Donnellii, Aust.
Eboracensis, Gott.

Grayana, Mont.
Hallii, Aust.
Hutchinsiæ, (Hook.), Nees.
Kunzei, Lehm. and Lindb.
Leana, Aust.
Nisqualensis, Sulliv.
Oakesiana, Aust.
plana, Sulliv.
saxicola, Aust.
squarrosa, Nees.
Sullivantii, Aust.
Tamarisci, Nees.
Virginica, Gott.

GEOCALYX, Nees.
graveolens, (Schrad), Nees.

GRIMALDIA, Raddi.
barbifrons, Bisch.
sessilis, Sulliv.

JUNGERMANIA, L.
alpestris, Schleich.
Bantriensis, Hook., var. Mulleri, Lindb.
barbata, Schreb.
var. attentata, Mart.
bicuspidata, L.
biformis, Aust.
cordifolia, Hook.
crenulata, Smith.
var. gracillima, Hook.
crenuliformis, Aust.
excisa, Dicks.
var. crispata, Hook.
fossombronioides, Aust.
Gilmani, Aust.
Helleriana, Nees.
Hornschiana, Nees.
hyalina, Lyell.
incisa, Dicks.
inflata, Huds.
var. fluitans,
Michauxi, Weber.
minuta, Crantz.
pleniceps, Aust.
polita, Nees.
porphysoleuca, Nees.
pumila, Witte.
Schraderi, Mart.
setiformis, Ehrh.
sphærocarpa, Hook.
Sullivantiæ, Aust.
ventricosa, Dicks.
Wallrothiana, Nees.
Wattiana, Aust.

LEJUNIA, Libert.
auriculata, Hook. and Wils.
calyculata, Tayl.
cavifolia, (Ehrh.), Lindb.
clypeata, Schwein.
cucullata, Nees.
cyclostipa, Tayl.
echinata, (Hook.), Tayl. M. S.
fooriana, Aust.
longiflora, Tayl.
minutissima, Dumort.
Mohrii, Aust.
polyphylla, Tayl.
Sullivantiæ, Aust.
testudinea, Tayl.

LEPIDOZIA, Nees.
reptans, (L.), Nees.
setacea, (Web.), Mitt.

LEPTOSCYPHUS.
Taylori, (Hook.), Mitt.

LIOCHLÆNA,
lanceolata, (L.), Nees.

LOPHOCOLEA, Nees.
bidentata, (L.), Nees.
crocata, (DeNot.), Nees.
Hallii, Aust.
heterophylla, (L.), Nees.
Macouni, Aust.
minor, Nees.

MADOTHECA, Dumort.
Bolanderi, Aust.
involuta, Hampe.
navicularis, (Lehm. and Lindb.), Nees.
platyphylla, (L.), Dumort.
porella, (Dicks.), Nees.
rivularis, Nees.
Sullivanti, Aust.
thuja, Dicks.
Watangensis, Sulliv.

MARCHANTIA, L.
disjuncta, Sulliv.
polymorpha, L.

MASTIGOBRYUM, Nees.
deflexum, (Mart.), Nees.
trilobatum, (L.), Nees.
var. *tridenticulatum.*

MASTIGOPHORA,
Californica, Aust.

METZGERIA, Raddi.
furcata, (L.), Nees.
pubescens, Raddi.

ODONTOCHISMA, Dumort.
Hubeneriana, Rab.
scutata, (Web.), Aust.
Sphagni, (Dicks.), Dumort.

PELLIA, Raddi.
calycina, (L.), Nees.
epiphylla, (L.), Nees.
porphyrorrhiza, (Nees.), Aust.

PHRAGMICOMA, Dumort.
clypeata, (Schwein), Sulliv.
xanthocarpa, L. and Lg.

PLAGIOCHASMA, Lehm. and Lindb.
erythrosperma, Sulliv.
Wrightii, Sulliv.

PLAGIOCHILA, Nees and Mont.

asplenoides, (L.), Nees and Mont.
interrupta, Nees.
Ludoviciana, Sulliv.
porelloides, Lindb.
spinulosa, (Dicks.), Nees and Mont.
undata, Sulliv.
PLEURANTHE, Tayl.
olivacea, Tayl.
PRESSIA, Nees.
commutata, (Lindb.), Nees.
RADULA, Nees.
Caloosiensis, Aust.
complanata, (L.), Dumort.
Hallii, Aust.
obconica, Sulliv.
pallens, (Swz.), Nees.
spicata, Aust.
Sullivanti, Aust.
Xalapensis, Mont.
RICCIA, Mich.
albida, Sulliv.
arvensis, Aust.
var. hirta, Aust.
Beyrichiana, Hampe.
bifurca, Hoffm.
Californica, Aust.
crystallina, L.
Donnellii, Aust.
fluitans, L.
var. terrestris.
var. lata.
var. canaliculatus, Hoffm.
Frostii, Aust.
glauca, L.
lamellosa, Raddi.
Lescuriana, Aust.
lutescens, Schwein.
natans, L.
var. terrestris, Aust.
nigrella, DeCand.
sorocarpa, Bisch.
Sullivanti, Aust.
tenuis, Aust.
tumida, Lindb.
Watsoni, Aust.
SARCOSCYPHUS, Corda.
adustus, Nees.
Bolanderi, Aust.
emarginatus, (Ehrh.).
var. aquaticus, G. L. N.
sphacelatus, (Gies.), Nees.
SAUTERIA,
limbata, Aust.
SCAPANIA, Lindb.
albicans, (L.), Mitt. var. taxifolia.
Bolanderi, Aust.
breviflora, Tayl.
compacta, (Roth.), var. irrigua.
exsecta, (Schmidt).
nemorosa, (L.), Nees.
Oakesii, Aust.
Peckii, Aust.
subalpina, (Nees.).
uliginosa.
umbrosa, (Schrad.) Nees.
undulata, (L.) Nees and Mont.
SENDTNERA, Endl.
juniperina, Nees.
SPHÆROCARPUS, Mich.
Berteri, Mont.
Californicus, Aust.
Donnellii, Aust.
Michelii, Bellardi.
Texanus, Aust.
SPHAGNŒCETIS, Nees.
Macouni, Aust.
STEETZIA, Lehm.
Lyelli, (Hook.) Lehm.
TARGONIA,
Michelii, Corda.
THALLOCARPUS, Lindb.
Curtissi, Aust.
TRICHOCOLEA, Nees.
Tomentella, Nees.

Genera, 49; species, 219; varieties, 17.

The Mistletoe.—The Mistletoe of the Eastern States has a general resemblance to that of Europe, *Viscum album;* but the old genus *Viscum* has been divided by modern botanists, although the lines of distinction are somewhat artificial. We have two genera, *Phoradendron* and *Arceuthobium*. Among the leading distinctions may be mentioned that the European branch of the family, *Viscum*, as now restricted, has the anther open by three pores or slits, our *Phoradendron* by two, while the *Arceuthobium* has but one. There are other slight differences in pollen grains, cotyledons, and form of the fruits. The European Mistletoe is usally found on deciduous trees only, an instance being recorded where it has been found on the Scotch pine in Germany, and its American representative, *Phoradendron*

flavescens, Nuttall, seems also confined to deciduous trees and shrubs. This extends across the continent, a form being found on the Pacific coast still confined to deciduous plants; while another genus. *Arceuthobium*, seems wholly confined to the coniferous trees which are mixed with the deciduous ones. The name *Arceuthobium* is suggestive of this fact, it being derived from two Greek words signifying "living on the juniper." *Phoradendron*, on the other hand, means simply "living on, or stealing from trees." *Arceuthobium*, however, does not live wholly on junipers. In the herbarium of the Phila. Academy is a specimen of *A. occidentale*, growing on *Juniperus occidentalis*—some Nevada specimens are on *Pinus ponderosi*. I have specimens of *Phoradendron juniperinum* from Nevada growing on *Libocedrus decurrens*, which, by the way, is, I believe, the first time this pretty cupressineous tree has been reported from the State of Nevada. Among the differences noted by Engelmann in the Botany of California, between *Phoradendron* and *Arceuthobium*, is that while the former flowers in February and March, and matures its fruit "next winter," the fruit of the Californian species opens in the summer, and does not mature till the "second autumn." The European Mistletoe is stated by Bentham to open in spring, and perhaps this is so; it was formerly supposed to be the case with the American *Phoradendron flavescens*, but Mr. Wm. Canby had shown to the Phila. Academy recently, that in Delaware the flowers open in the fall, and the fruit matures in the autumn of the following year, or just one year afterward. The flowers and fruit are on the trees at the same time together. If this is general with *Phoradendron*. it still lessens the distinctions between the genera. Usually *Phoradendron* bears leaves, while *Arceuthobium* is leafless—but the *Libocedrus* parasite is as destitute of leaves as an *Arceuthobium*, and the common observer would see little in their general aspects to distinguish them. But there is one great difference in the genus, at least as represented by these two species. In opening the box which contained the specimens, the whole mass was covered with a dense viscid secretion, which rendered it very difficult to separate one branch from another. On leaving the lid open a little while, the watery particles soon evaporated, leaving a dry gummy deposit over the whole surface. While this was going on, the seeds were ejected with great force from their endocarps. being projected against the face with such force as to leave a stinging sensation. Dr. Engelmann has noted this power of ejection in the berries of this plant. The *Phoradendron* exhibits no trace of any such power, though there seems to be little difference in the structure of the berries. These facts raise a nice teleological question. Birds do not seem to use the berries. As they are so viscid that the famous bird-lime is made from some species, it is probable the very viscidity would prevent the free use of the beak in any attempt to use the seeds. But it is believed that by becoming attached to the feet or feathers of birds, the seeds are widely distributed, and that in this way the plant has all the advantage necessary for distribution in the "struggle for life." But *Arceuthobium*, besides all the advantages

to be derived from this mode of distribution, has an additional aid from a projecting force.

Did *Arceuthobium* at one time exist when or where there were no birds, and had it to depend on this projection alone for its distributing power, and is the viscidity a later development? Did *Phoradendron* once possess the power, and has it abandoned it from having through the ages found out that it travels well enough without its exercise? Or is it rather, as I am inclined to believe, that nature loves to aim expressly at variety, and is continually exhibiting her power to accomplish the same end by a wonderful variety of means? But whatever may be thought of the various theories of development, and the laws of final causes which may have operated to produce changes, there can be but little doubt but parasitism is an acquired habit, and the endeavor to find out what these plants were, and how they behaved before they were parasites, is fast becoming one of the most interesting of biological studies.

The seeds ejected from the endocarp in *Arceuthobium* fasten themselves to the branches of trees by a glutinous mass at one end. This end is opposite to the radicle, which, in germinating, has to push out from above, and curve downward towards the branch in order to attach itself. I have not seen them during the process of germination, but as the testaceous covering is held fast by the glutinous secretion, it is probable the cotyledons are drawn out as the plumule takes its upright position, leaving the testa as an empty case fastened to the branch. Presuming that this must be the case with other Loranthaceous plants, it is difficult to understand the process by which the East Indian species performs the locomotive feat recently noted by Dr. Watt, and which from its remarkable nature has had a wide publication. It was reported as the observation of Dr. Watt that a seed falling on and becoming attached to the coriaceous leaf of a *Memecylon*, would send out its radicle, which, curving down, formed a flattened disk by which it attached itself to the leaf. But, as if it knew that a leaf could not permanently support a perennial plant, the cotyledons were lifted and turned to the other side, when the end with the disk moved to another place, and in this way the seed traveled to a more favorable spot. Without reflecting on the observation, I believe it should be repeated in order to be sure of no mistake. In all plants in our country which fasten to an object through a disk at the end of a rootlet or tendril, as in *Ampelopsis* and *Bignonia capreolata*, the attachment is made while the disk is forming. A disk once formed, does not reattach itself to an object when removed from the original spot. In like manner the cotyledons, once removed from the endocarps, would have no viscidity with which to form a resisting power while the disk was unfastening itself from its undesirable location. There is, however, so much of singular behavior in the Mistletoe family that further observations are very desirable. — THOS. MEEHAN, *Proc. Phil. Acad.*

Pastinaca sativa Proterandrous.—Umbelliferæ are mostly proterogynous, and so it was a matter of surprise to me to find an exception in our common Parsnip. The anthers discharge their pollen very early and fall off while the rudimentary styles can be seen as mere protuberances on the disk crowning the ovary. In time, the styles lengthen, separate, the stigmas develop, and the flower is now capable of being fertilized. This is accomplished by means of numerous small coleoptera and other insects which frequent the plant. As the plant is fertile with its own pollen, this arrangement must exist to prevent excessive close breeding.—AUG. F. FOERSTE, *Dayton, O.*

Malvastrum angustum in Ottawa, Ill.—I have found *Malvastrum angustum* in Ottawa on Trenton limestone. The only locality given in Gray's Manual is Rock Island, and Patterson says, in his catalogue of Illinois plants, that that locality is now covered by the government buildings. It was almost past blossoming when discovered, but I have several fruited specimens for exchange. It grows quite near, and in the same formation with the *Petalostemon foliosus*. *Croton capitatus* is also abundant near by, and *Calamintha glabella*, var. *Nuttallii*.—H. L. BOLTWOOD.

Notes From Dayton, Ohio.—In a *Dicksonia punctilobula*, Kunze, collected by Mr. A. P. Morgan, I noticed several pinnæ forking a little above their bases. This variation, although not rare in other genera, I have never seen mentioned in a *Dicksonia*.

I have also found *Lycoperdon pedicellatum*, Peck, a species hitherto found only in New York. I am indebted to its author for the determination.—AUG. F. FOERSTE.

List of the Genus Carex.—With this number we publish as an extra the first part of a list of the species of *Carex* as found in Gray's Manual, with the synonymy. Mr. J. F. James, Curator of the Cincinnati Society of Natural History, was led to the preparation of this list by his own needs; and thinking that the needs of many other botanists may be similar, we present it to our subscribers as a help to their study of this troublesome genus. The list will probably be completed with the next number.

Notes From Independence, Mo.—During the past season I have found here *Conobea multifida*, Benth. with ternate leaves, though rarely the upper are in twos.

A white flowered form of *Verbena stricta*, Vent., with a white flowered *Delphinium exaltatum* Ait., both abundant.

Specularia leptocarpa, Gray, very plenty on damp rocks. *Verbena Aubletia* L., and *bracteosa* Michx., in dry and open prairies, both very common

Salvia azurea, Lam., with the variety *grandiflora*, Benth., which seems very distinct.

Solanum rostratum, Dunal, is a pest on our streets and seems like a native. Can furnish a number of the above on exchange.—FRANK BUSH